

- ☒ Existed in the 2002 State / Commerce in 2002  
☒ Added after 2002, but within the scope of the ruling  
☒ Outside the scope of the ruling - this module is independent and

State/ Commerce classified 2D001 in 2002	Module	Software Changes	Package	Institution	Tech Lead	NTR#	Description
<input checked="" type="checkbox"/>	ROAMS		3rd Party Packages	JPL		NTR#	Rover simulation software classified as 2D001
<input checked="" type="checkbox"/>	ACE		3rd Party Packages	RiverAce			3rd party package that provides a generic interface to different operating systems
<input checked="" type="checkbox"/>	CPPUnit		3rd Party Packages	OpenSrc			Regression testing software tools
<input checked="" type="checkbox"/>	arc_event_logger	infrastructure changes only	Base	multiple		main	Simple placeholder for logging robot events used for ARC's FY03 end of year testing
<input checked="" type="checkbox"/>	argument_parser	infrastructure changes only	Base	multiple		main	Software constructs to parse command line options and arguments
<input checked="" type="checkbox"/>	battery	infrastructure changes only	Base	multiple		main	Software constructs for monitoring battery charges and power system
<input checked="" type="checkbox"/>	behavior	infrastructure changes only	Base	multiple		main	Software constructs for developing behavior for mobile robots
<input checked="" type="checkbox"/>	cmd_base	infrastructure changes only	Base	multiple		main	Constructs for tracking commands issued to the robot
<input checked="" type="checkbox"/>	data_io	infrastructure changes only	Base	multiple		main	Software constructs for serialization, deserialization, and data transport
<input checked="" type="checkbox"/>	dev_camera	infrastructure changes only	Base	multiple		main	Interface definition for a generic camera and image acquisition functions
<input checked="" type="checkbox"/>	dev_io	infrastructure changes only	Base	multiple		main	Software constructs for generic discrete I/O devices.
<input checked="" type="checkbox"/>	dev_manipulator	infrastructure changes only	Base	multiple		main	Software constructs and interface for generic robotic arm
<input checked="" type="checkbox"/>	dev_motor	infrastructure changes only	Base	multiple		main	Software constructs and interface for generic motor
<input checked="" type="checkbox"/>	device	infrastructure changes only	Base	multiple		main	Software constructs for managing different device types such as motors, cameras, locomotors and manipulators
<input checked="" type="checkbox"/>	diag	infrastructure changes only	Base	multiple		main	Software algorithms for basic robot diagnosis
<input checked="" type="checkbox"/>	ext_ace	infrastructure changes only	Base	multiple		main	3rd party package that provides a generic interface to different operating systems
<input checked="" type="checkbox"/>	ext_linux1394	infrastructure changes only	Base	multiple		main	3rd party package that provides linux drivers for FireWire
<input checked="" type="checkbox"/>	frame	infrastructure changes only	Base	multiple		main	Frame is used to identify the relative coordinate frames of all elements of a system.
<input checked="" type="checkbox"/>	frame_tree	infrastructure changes only	Base	multiple		main	Software constructs that relate coordinate frame transformation to one another
<input checked="" type="checkbox"/>	interface	new module	Base	multiple		main	A collection of interfaces to common robotic components/devices/algorithms (motors, cameras, etc.).
<input checked="" type="checkbox"/>	make	new module	Base	multiple		main	Contains the makefiles and scripts to build the software in the sandbox and run regression tests.
<input checked="" type="checkbox"/>	parameter_parser	infrastructure changes only	Base	multiple		main	Parser for XML-like parameter definitions.
<input checked="" type="checkbox"/>	resource	infrastructure changes only	Base	multiple		main	Module that has the Timer, Task and other resource classes, Includes Sensor_Logger and Sensor_Replayer classes to support logging sensor data during a run and replaying it to simulate the run off-line.
<input checked="" type="checkbox"/>	serial_stream	infrastructure changes only	Base	multiple		main	Serial communications interface layer to allow non platform-specific software interfaces to be written for devices which use serial to communicate.
<input checked="" type="checkbox"/>	share	infrastructure changes only	Base	multiple		main	This modules has some common definitions and header files that are used throughout the CLARAty architecture (Functional Layer - currently).
<input checked="" type="checkbox"/>	share_cmu	new module	Base	multiple		main	This contains common functions and classes developed at CMU.
<input checked="" type="checkbox"/>	string_io	infrastructure changes only	Base	multiple		main	Support for string manipulation, and serialization and deserialization to streams.
<input checked="" type="checkbox"/>	tao_util	new module	Base	multiple		main	Utilities to support CLARAty use of the ACE/TAO CORBA ORB.

✓	telemetry	infrastructure changes only	Base	multiple	main	Base module for representing telemetry.
✗	tree	new module	Base	multiple	main	STL-style tree data structure supporting tree-level locking and node subclassing.
✗	util_java	new module	Base	multiple	main	This is a compiled .jar file used by the decision layer for regular expressions.
✓	util_open_gl	infrastructure changes only	Base	multiple	main	This module provides some basic classes that simplify using the OpenGL rendering library.
✓	wheel	infrastructure changes only	Base	multiple	main	A module containing wheel information
✓	x_windows	infrastructure changes only	Base	multiple	main	This module contains functions to create and work with simple X-based windows containing gray-scale or color images.
✓	point_cloud	infrastructure changes only	Base	multiple	main	This module contains a collection of 3D points.
✓	point_image	infrastructure changes only	Base	multiple	main	Point_image is a 2-d collection of 3-d points
✓	points	infrastructure changes only	Base	multiple	main	Has points, locations, vertices, etc
✓	connector	infrastructure changes only	Communication	multiple	main	Software constructs for commanding and retrieving information about a robot over a serial connection. Used as the interface between the Functional Layer and the Decision Layer
✓	connector_messaging	infrastructure changes only	Communication	multiple	main	Software constructs for generic messaging objects used by the connector and by the Decision Layer
✗	corba_fd_rover	new module	Communication	multiple	main	CORBA interface to the FIDO rover class.
✗	corba_jpl_rover	new module	Communication	multiple	main	CORBA interface to the JPL_Rover class.
✗	corba_rover	new module	Communication	multiple	main	CORBA interface to the Rover class.
✗	corba_share	new module	Communication	multiple	main	Common software constructs for CORBA interface modules.
✗	corba_simple_sim_rover	new module	Communication	multiple	main	CORBA interface to the Simple_Sim_Rover class which is a rover simulation
✗	corba_update_service	new module	Communication	multiple	main	Wrapper classes to make it easy for FL and DL components to make use of the CORBA Notification Service.
✓	downlink	infrastructure changes only	Communication	multiple	main	Software constructs for creating data records using the EDR format.
✗	experiment_data	new module	Communication	multiple	main	Algorithm that generate data records using EDR format
✗	remote_camera	infrastructure changes only	Communication	multiple	main	The remote_camera is a CLARAty implementation of camera using the Distributed Avionics Software framework to connect to a camera server on a remote processor.
✗	remote_imu	infrastructure changes only	Communication	multiple	main	The remote imu is a CLARAty implementation of an IMU using the Distributed Avionics Software framework to connect to an IMU server on a remote processor.
✗	remote_locomotor	infrastructure changes only	Communication	multiple	main	The remote_locomotor is a CLARAty implementation of locomotor using the Distributed Avionics Software framework to connect to a locomotor server on a remote processor.
✗	remote_motor	infrastructure changes only	Communication	multiple	main	The remote_motor is a CLARAty implementation of motor using the Distributed Avionics Software framework to connect to a motor server on a remote processor.
✗	remote_navigator	infrastructure changes only	Communication	multiple	main	The remote_navigator is a CLARAty implementation of a navigator using the Distributed Avionics Software framework to connect to a navigator server on a remote processor.
✗	remote_point_cloud_source	infrastructure changes only	Communication	multiple	main	This module uses DistAv capabilities (in project_pluto) to wrap a DistAv image interface as a point_cloud_source suitable for use with morphin.
✗	remote_stereo_vision	infrastructure changes only	Communication	multiple	main	The remote_stereo_vision module is a CLARAty implementation of stereo vision using the Distributed Avionics Software framework to connect to a stereo vision server on a remote processor.
✓	socket_messages	infrastructure changes only	Communication	multiple	main	Creates Socket Messages.
✓	sockets	infrastructure changes only	Communication	multiple	main	Software to communicate over TCP/IP sockets
✗	user_cmu_ace_interface	infrastructure changes only	Communication	multiple	main	This module provides a number of classes to get data to and from the robot using binary data streams implemented with ACE.
✓	dl_cfg_file_io	infrastructure changes only	Decision Layer	multiple	main	Parsing functions for standard .cfg files used by connector connector_client and DL

✗	executive_plexil	new module	Decision Layer			contract	Software algorithms that generate contingent plans for execution on a robotic platforms
✓	executive_tcm	infrastructure changes only	Decision Layer	CMU	Simmons	contract	Software algorithms that generate activities for the robot to execute.
✓	executive_tdl	infrastructure changes only	Decision Layer	CMU	Simmons	contract	Software algorithms that generate activities for the robot to execute.
✓	planner_aspen	infrastructure changes only	Decision Layer	JPL	Estlin	NPO-35227	General planning algorithms
✗	plexil_executive	new module	Decision Layer	ARC	Verma, Jonson, Tso		Executive to generate contingent plans
✓	draw_ops	infrastructure changes only	Display	multiple		main	Operations to overlay graphics on an image or color image
✗	ext_vizclient	new module	Display	multiple		main	3rd party package the simulates rovers and terrain
✓	grid_visualization_tool	infrastructure changes only	Display	multiple		main	Tools for viewing of grid-based images
✓	image_displayer	infrastructure changes only	Display	multiple		main	Algorithms to displays generic images using a Qt GUI.
✓	image_monitor	infrastructure changes only	Display	multiple		main	Tool to display images from continuous image feed over a TCP socket link
✓	navigator_gui	infrastructure changes only	Display	multiple		main	This module will contain some guis used to debug the navigator.
✓	qt_battery	infrastructure changes only	Display	multiple		GPL	Graphics tools to display battery data
✓	qt_camera	infrastructure changes only	Display	multiple		GPL	Graphics tools to display camera data
✓	qt_dev_io	infrastructure changes only	Display	multiple		GPL	Graphics tools to display I/O data
✓	qt_device	infrastructure changes only	Display	multiple		GPL	Graphics tools to display general device data
✓	qt_frame	infrastructure changes only	Display	multiple		GPL	Graphics tools to display coordinate frame data
✓	qt_image	infrastructure changes only	Display	multiple		GPL	Graphics tools to display image data
✓	qt_locomotor	infrastructure changes only	Display	multiple		GPL	Graphics tools to display locomotion data
✓	qt_manipulator	infrastructure changes only	Display	multiple		GPL	Graphics tools to display manipulation data
✓	qt_motor	infrastructure changes only	Display	multiple		GPL	Graphics tools to display motor data
✓	qt_telem	infrastructure changes only	Display	multiple		GPL	Graphics tools to display telemetry data
✓	qt_util	infrastructure changes only	Display	multiple		GPL	Utilities for graphics display
✓	vector_visualization_tool	infrastructure changes only	Display	multiple		main	This modules contains teh plotpath tool used by the DL to view vector-based images/maps.
✗	vizclient_image	infrastructure changes only	Display	multiple		main	Utilities and tools for displaying images from CLARAty in the Viz 3D virtual environment using the remote socket interface
✗	vizclient_util	infrastructure changes only	Display	multiple		main	Utilities and tools for interfacing between CLARAty and the Viz 3D virtual environment remote socket interface
✓	absolute_heading_sensor	infrastructure changes only	Estimation	multiple		main	Software constructs for processing absolute heading measurements relative to a global reference frame
✗	absolute_heading_sun_sensor	new module	Estimation	multiple		main	Algorithm that find the location of the sun in image acquired by a camera looking at the sky. The algorithm uses basic image processing to threshold and find the centroid of a bright circle in a dark image.
✓	estimation	infrastructure changes only	Estimation	multiple		main	Software constructs for position and orientation estimation for a mobile platform
✓	estimator	infrastructure changes only	Estimation	multiple		main	Software constructs for position and orientation estimation for a mobile platform
✓	estimator_telem	infrastructure changes only	Estimation	multiple		main	Software constructs for logging estimation variables
✓	localizer_visual_olsen	infrastructure changes only	Estimation	JPL	Olson	contract	Localization based on match visual features from navigation cameras
✓	location_estimator	infrastructure changes only	Estimation	multiple		main	Algorithm to estimate rover pose
✗	locomotor_estimator	new module	Estimation	multiple		main	Software to estimate the position and orientation of a mobile robot
✗	locomotor_state_estimator	new module	Estimation	multiple		main	Provides estimation of locomotor state using a Locomotor_State object to represent the estimated state.
✓	pose_estimator_ekf_3d	infrastructure changes only	Estimation	JPL	Baumgartner	NPO-?	Implementation of the Fido EKF position estimator

✗	pose_estimator_ekf_6d	new module	Estimation	UMN	Roumeliotis	contract	Compute position and orientation of a rover using an Extended Kalman Filter
✓	pose_estimator_fd	infrastructure changes only	Estimation	multiple		main	Implementation of Fido EKF rover pose estimation algorithm
✗	pose_estimator_flexnav	new module	Estimation	U.Michigan	Borenstein	contract	Code contributed by Johann Borenstein from the Mobile Robotics Lab at University of Michigan, Ann Arbor.
✗	pose_estimator_mer	new module	Estimation	JPL		main	Algorithm to compute position and orientation of a rover using integration
✓	pose_estimator_odo	infrastructure changes only	Estimation	multiple		main	Position estimation based on locomotor wheel odometry
✓	pose_estimator_sojourner	infrastructure changes only	Estimation	multiple		main	Algorithm to compute position and orientation of a rover using z-axis integration only
✓	pose_estimator_vo	infrastructure changes only	Estimation	JPL	Johnson		This is a wrapping of Andrew Johnsons version of visual odometry.
✗	sun_sensor	infrastructure changes only	Estimation	multiple		main	Generic module that contains sun sensor code
✗	sun_sensor_camera	infrastructure changes only	Estimation	multiple		main	This is the camera-based sun sensor implementation of sun sensor.
✗	sun_sensor_heading	infrastructure changes only	Estimation	multiple		main	This module is the sun sensor heading implementation for the absolute heading sensor class.
✓	aej_visual_odometry	infrastructure changes only	Estimation/ Vision	JPL	A. E. Johnson	NTR#	Uses a sequence of stereo images to compute the change in a rover pose (position and orientation)
✓	aej_visual_odometry_state_estimai	infrastructure changes only	Estimation/ Vision	JPL	McHenry	main	Software constructs that Integrate the aej_visual_odometry with the CLARAty state estimation framework
⊘	navigator_gestalt_mer	new restricted module	Excluded	JPL	McHenry		Temporary place for cleaned up version of navigator_gestalt_mer
⊘	project_msl_brassboard	new restricted module	Excluded	JPL	Helmick		
⊘	radiationTesting	new restricted module	Excluded	multiple		main	This is software built for the radiation testing of the ML300.
✗	is_camera	new module	Hardware Adaptation	multiple		main	Software simulation that takes simulated pancam images.
✗	powercube_motor	new module	Hardware Adaptation	multiple		main	Interface to Amtec Powercube motor controller software
✓	camera_ieee1394	infrastructure changes only	Hardware Adaptation	multiple		main	Software adaptation for cameras that use an IEEE 1394 (FireWire) bus.
✓	camera_linux1394	infrastructure changes only	Hardware Adaptation	multiple		main	Software adaptation for cameras that use an IEEE 1394 (FireWire) bus under Linux.
✗	hw_aardvark-i2c	new module	Hardware Drivers	multiple		main	Wrapper for the Aardvark USB/I2C hardware adapter.
✗	hw_aardvark-i2c_master	new module	Hardware Drivers	multiple		main	I2C Bus master for the Aardvark USB/I2C adapter.
✗	hw_amtec_motor	new module	Hardware Drivers	multiple		main	Motion control driver for the AMTEC joints
✓	hw_aotf_spectrometer	infrastructure changes only	Hardware Drivers	multiple		main	Interface software for the Brimrose AOTF NIR Spectrometer
✓	hw_bb232_sda12_io	infrastructure changes only	Hardware Drivers	multiple		main	Host interface software to communicate with the BB232_sda12 analog io module.
✗	hw_brainstem	new module	Hardware Drivers	multiple		main	Interface software for Acroname Brainstem boards.
✗	hw_brainstem_motor	new module	Hardware Drivers	multiple		main	Interface software for Acroname GP and Moto boards.
✓	hw_dmu-hdx	infrastructure changes only	Hardware Drivers	multiple		main	Driver for the Crossbow DMU-HDX inertial measurement unit.
✓	hw_fdspectrometer	infrastructure changes only	Hardware Drivers	multiple		main	Software driver and application for the FIDO custom Infra-red Spectrometer (IPS)
✓	hw_hctl1100-motorcontroller	infrastructure changes only	Hardware Drivers	multiple		main	Drivers for the HCTL 1100 motion control chip from Agilent Technologies
✓	hw_hmr3000-compass	infrastructure changes only	Hardware Drivers	multiple		main	Interface software for Honeywell HMR3000 compass
✓	hw_i2c_master	infrastructure changes only	Hardware Drivers	multiple		main	Generic I2C bus master for communicate with device on I2C Bus
✓	hw_i2c_master_bitbang	infrastructure changes only	Hardware Drivers	multiple		main	I2C master class for use with the parallel port directly bit banging the I2C bus.
✓	hw_i2c_master_pic_firmware	infrastructure changes only	Hardware Drivers	multiple		main	PIC firmware for an I2C master
✓	hw_i2c_master_pic_host	infrastructure changes only	Hardware Drivers	multiple		main	Host software to interface to a PIC I2C master
✓	hw_i2c_master_tracii	infrastructure changes only	Hardware Drivers	multiple		main	I2C master class for use with the Tracii 400 parallel to I2C interface card.

✗	hw_i2c_master_xilinx	new module	Hardware Drivers	JPL		main	Interface to the Xilinx Virtex II Pro I2C device for the ML300 development board.
✓	hw_i2c_tracii400	infrastructure changes only	Hardware Drivers	multiple		main	Hardware interface for the Tracii 400 I2C interface.
✓	hw_i2c_widget_board	infrastructure changes only	Hardware Drivers	multiple		main	Widget Board code for Motor control, DIO, and AIO
✓	hw_i2c_widget_firmware	infrastructure changes only	Hardware Drivers	JPL	Nesnas	NPO-30243	Widget Board Motor controller firmware.
✗	hw_i2c_xilinx	new module	Hardware Drivers	JPL			Interface to the Xilinx Virtex II Pro I2C device on the ML300 development board.
✓	hw_isa_p400-counter	infrastructure changes only	Hardware Drivers	multiple		main	Driver for the P400 encoder counter board
✓	hw_isis-imu	infrastructure changes only	Hardware Drivers	multiple		main	Driver for ISIS Inertial Measurement Unit from Inertial Sciences Inc.
✗	hw_k10_rangefinder	new module	Hardware Drivers	multiple		main	Code to get data from SRF10 ultrasonic sensors when connected to a brainstem GP1.0.
✗	hw_k9_gps_pipe	new module	Hardware Drivers	multiple		main	Pipe_device handles all the device interfacing (receive only).
✗	hw_k9_laser_scanner	new module	Hardware Drivers	multiple		main	Driver for K9's scanning laser range scanner.
✓	hw_max186-analog_to_digital	infrastructure changes only	Hardware Drivers	multiple		main	Driver for MAX 186/188 12-bit serial analog to digital converter
✓	hw_max528-digital_to_analog	infrastructure changes only	Hardware Drivers	multiple		main	Driver for MAX528 - 8 bit serial DAC (digital to analog converter) with output buffer
✓	hw_pci	infrastructure changes only	Hardware Drivers	multiple		main	Generic PCI bus software constructs
✓	hw_pci_acromag_ip330-analog_in	infrastructure changes only	Hardware Drivers	multiple		main	Driver for ACROMAG analog Input Output board
✓	hw_pci_mr1394-camera	infrastructure changes only	Hardware Drivers	multiple		main	Driver for 1394 (Firewire) digital camera driver built on top of the Mindready SedNet Pro 1394 stack.
✓	hw_pci_msi_p415-analog_in	infrastructure changes only	Hardware Drivers	multiple		main	Driver for MSI P415 analog input board
✓	hw_pci_msi_p460-analog_out	infrastructure changes only	Hardware Drivers	multiple		main	Driver for MSI P460 analog output board
✓	hw_pci_msi_p560-digital_io	infrastructure changes only	Hardware Drivers	multiple		main	Driver for MSI P560 digital input / output board
✗	hw_pci_ni6036e-analog_io	new module	Hardware Drivers	multiple		main	National Instruments board with 16 channels (8 differential) of 16-bit analog input, 2 channels of 16-bit analog output, and 8 lines of DIO
✗	hw_pci_ni96-digital_io	new module	Hardware Drivers	multiple		main	Driver for National Instruments digital I/O board
✓	hw_pci_px610-framegrabber	infrastructure changes only	Hardware Drivers	multiple		NDA	Driver for PX610 framegrabber from CyperOpitcs
✓	hw_pci_pxc200-framegrabber	infrastructure changes only	Hardware Drivers	multiple		NDA	Driver for PX610 framegrabber from CyperOpitcs
✓	hw_pci_s720-digital_io	infrastructure changes only	Hardware Drivers	multiple		main	Driver for S720 digital I/O board
✗	hw_picserve_motor	new module	Hardware Drivers	multiple		main	Interface module to communicate with the commercially available PIC-SERVO motor controllers created by J.R. Kerr.
✗	hw_powercube-motorcontroller	new module	Hardware Drivers	multiple		NDA	Proprietary library written by Amtec to control all Powercube devices over all supported buses
✗	hw_rflex	new module	Hardware Drivers	multiple		main	RFLEX family of drivers are used to control RWI robots (ATRV, ATRV-JR, B21, etc) by directly communicating with RFLEX onboard the robot
✓	hw_serial_port	infrastructure changes only	Hardware Drivers	multiple		main	Generic access to a system serial port.
✗	hw_srf10-range_finder	new module	Hardware Drivers	ARC	Lee	main	Driver for SRF10 small low-cost ultrasonic range finder.
✗	hw_star	new module	Hardware Drivers	multiple		main	Driver for the STAR six legged climbing robot
✗	hw_usb_dlp-io	new module	Hardware Drivers	multiple		main	Interface software for DLP Design's USB I/O boards.
✓	hw_vme-to-isa	infrastructure changes only	Hardware Drivers	multiple		main	Software to bridge VME bus to ISA bus
✓	hw_vme_cx100-framegrabber	infrastructure changes only	Hardware Drivers	multiple		main	Driver for CX100 framegrabber
✓	hw_vme_lm629-motorcontroller	infrastructure changes only	Hardware Drivers	multiple		main	Driver for LM629 motion control chip from National Semiconductor
✓	hw_vme_vadc20-analog_io	infrastructure changes only	Hardware Drivers	multiple		main	Driver for VADC20 analog I/O board
✓	hw_vme_vpar10-digital_io	infrastructure changes only	Hardware Drivers	multiple		main	Driver for VPAR10 parallel digital I/O board
✓	hw_widget_master_tracii	infrastructure changes only	Hardware Drivers	multiple		main	I2C master class for use with the Tracii 400 parallel to I2C interface card.
✗	hw_xilinx_memory	new module	Hardware Drivers	multiple		main	Interface to the Xilinx ML300 via C++ methods.

✓	i2c_master	infrastructure changes only	Hardware Drivers	multiple		main	Generic software constructs for the master side of an I2C communication bus.
✗	powercube_bus	new module	Hardware Drivers				An implementation of a synchronized Motor_Bus that uses Amtec Powercube motors.
✓	widget_bus	infrastructure changes only	Hardware Drivers				Currently an implementation of Motor_Bus, but will, in the future, implement a digital and analog IO bus as well.
✓	bits	infrastructure changes only	Input / Ouput	multiple		main	Software constructs for manipulating bit fields
✓	input_output	infrastructure changes only	Input / Ouput	multiple		main	The input output module has all the digital I/O and analog I/O
✓	instrument	infrastructure changes only	Instrument	multiple		main	Base class providing functionality common to all instruments, such as cameras and spectrometers.
✓	instrument_consistency	infrastructure changes only	Instrument	multiple		main	Algorithms to check consistency among installed instruments
✓	instrument_safety_checker	infrastructure changes only	Instrument	ARC		contract	This module contains the instrument safety check code developed at Ames as part of the big suite of instrument placement programs.
✓	spectrometer	infrastructure changes only	Instrument	multiple		main	Base class providing functionality common to various types of spectrometers.
✓	spectrometer_model	infrastructure changes only	Instrument	multiple		main	Contains models for spectrometer.
✓	spectrometer_moessbauer	infrastructure changes only	Instrument	multiple		main	Captured ORCAA code for reading moessbauer spectrometer on Rocky 7.
✓	spectrum	infrastructure changes only	Instrument	multiple		main	Basic data type to represent spectral data.
✗	kinematic_model_yppp	new module	Manipulation	multiple		main	Defines general kinematics for 4-DOF manipulator with Yaw-Pitch-Pitch-Pitch kinematic configuration
✗	kinematics_model_ypppy	new module	Manipulation	multiple		main	Kinematics model for Yaw-Pitch-Pitch-Pitch-Yaw configuration serial link
✗	kinematics_model_ypyry	new module	Manipulation	multiple		main	Kinematics model for the YPYRY serial link
✓	ypppy_arm	infrastructure changes only	Manipulation	multiple		main	Kinematics of the 5DOF yaw-pitch-pitch-pitch-yaw arm
✓	manipulator	infrastructure changes only	Manipulation	multiple		main	Generic software constructs for controlling robotic arms
✗	convex_hull_rapid3d	new module	Manipulation / Vision	JPL	Leger	NPO-30356	Algorithms for detecting self collisions of a robotic arms and collision with the terrain. Uses intersection of bounding shapes to determine collisions
✗	visual_manipulation_hips	new module	Manipulation / Vision				Implementation of the vision-based technique for the control of robotic manipulators known as HIPS developed by Eric Baumgartner and Matthew Robinson. Algorithms for vision-based manipulation control of a robotic arm using the Hybrid Image Plane
✓	arrays	infrastructure changes only	Math	multiple		main	Software constructs and algorithms for one and two dimensional arrays
✗	bayes_network	new module	Math	CMU	Ramsey	contract	Software constructs and algorithms to represent Bayes Nets, read them from and write them to files, estimate them using a Dirichlet method, update them, all features accompanied by sensible unit tests.
✓	cost_function_dstar	infrastructure changes only	Math	CMU	Stentz	contract	A mathematical cost function whose value is based on the D* star search alorihmtm
✗	fuzzy_logic	new module	Math	multiple		main	Fuzzy Logic and Fuzzy Set math toolbox
✗	fuzzy_logic_utils	new module	Math	multiple		main	Additional tools for fuzzy logic math
✓	matrices	added algorithms for Cholesky decomposition and Frobenius norms	Math	multiple		main	Matrix software constructs and basic algorithms
✓	matrix_n_exp_n	infrastructure changes only	Math	multiple		main	Software constructs for matrices that are N^N dimensional
✓	numerics	infrastructure changes only	Math	multiple		copyright?	permission denied
✓	solver_1d	infrastructure changes only	Math	multiple		copyright?	Newton Raphson iteration math solved
✓	transforms	reimplemented software for higher performance	Math	multiple		main	This modules hold different types of transformrations such as quaternions and homogeneous transformations
✗	triangulated_mesh	new module	Math				This module contains the mesh code that used to live in the arc_vision module (which had been excised from the Ames VRLib).
✓	model_locomotor	infrastructure changes only	Mobility	multiple		main	This module contains the generic locomotor model classes
✓	sequence_drive	infrastructure changes only	Mobility	multiple		main	This module contains the drive sequence and drive command classes which provide a command interface between navigation and the locomotor

✓	locomotor	infrastructure changes only	Mobility	multiple		main	Software constructs for controlling a mobile robot
✓	arm	infrastructure changes only	Mobility and Manipulation	multiple		main	Software constructs for a robotic arm that implements the motion control of a Motor_Bus using a Serial_Manipulator_Model and Multi_Segment_Trajectory
✗	kinematics_model	new module	Mobility and Manipulation	multiple		main	General software constructs for kinematics models
✗	mechanism_model	new module	Mobility and Manipulation	multiple		main	Represents geometric, kinematic, dynamic, and physical properties of a mechanism in a central data structure for use by various applications.
✗	mechanism_model_io	new module	Mobility and Manipulation	multiple		main	This module contains software to read in and write out data to or from the Mechanism_Model class and its related classes.
✗	continuous_trajectory_generator	new module	Motion	multiple		main	A trajectory generator which creates continuous trajectories for mobile robots in rough terrain.
✓	sim_motor	infrastructure changes only	Motion	multiple		main	sim_motor is the code for the Claraty class derived from Ctrl_Motor_Impl.
✓	trajectory_generator	infrastructure changes only	Motion Control	multiple		main	This module has trajectory generators for motion control.
✓	motion_control	infrastructure changes only	Motion Control	multiple		main	Motion_Sequence class for sequences of motor set points
✓	motion_profile	infrastructure changes only	Motion Control	multiple		main	
✓	motor	infrastructure changes only	Motion Control	multiple		main	
✓	pid_controller	infrastructure changes only	Motion Control	multiple		main	This module implements various classes of PID controllers.
✗	drivemaps_traverse_analyzer	new module	Navigation	JPL	H. Aghazarian	NTR#	Algorithm to analyze terrain traversability that was used on the FIDO rover
✓	gestalt_navigator	infrastructure changes only	Navigation	multiple	Maimone	NPO-21233	The gestalt_navigator is a CLARAty port of the Gestal navigation code written by Mark Maimone.
✓	map_grid	infrastructure changes only	Navigation	multiple		main	Algorithms for grid/cell map decomposition.
✓	navigation	infrastructure changes only	Navigation	multiple		main	This module contains the generic navigation classes.
✓	navigator	infrastructure changes only	Navigation	multiple		main	Navigator is the generic navigator class for rovers.
✗	navigator_drivemaps	new module	Navigation	JPL	Aghazarian	NPO-30532	FIDO navigator and hazard avoidance algorithm.
✓	navigator_morphin	infrastructure changes only	Navigation	CMU	Simmons	?	This module contains code that puts together components to make a runnable program.
✓	navigator_sojourner	infrastructure changes only	Navigation	JPL	Morrison	?	This document describes the algorithm used by the Pathfinder rover (Sojourner) for semi-autonomous navigation for the Go To Waypoint and Find Rock commands.
✓	obstacle_mapper	infrastructure changes only	Navigation	multiple		main	Gestalt extract that takes an elevation map and generates an obstacle map.
✗	lattice_path_planner	new module	Path Planning	CMU	Kelly, Pivtoraiko	contract	Module implements an efficient path planner (Planner) that satisfies nonholonomic constraints of vehicle motion.
✓	path_planner_dstar	infrastructure changes only	Path Planning	CMU	Stentz	contract	Dstar used for path planning
✓	path_planner_dstar_dl	infrastructure changes only	Path Planning	multiple		main	D* code for Decision Layer.
✓	path_planner_roverbug	infrastructure changes only	Path Planning	JPL	Laubach	NPO-30241	Sharon Laubach's path planner imported from ORCAA code.
✓	path_planner_tangent_graph_dl	infrastructure changes only	Path Planning	JPL	Laubach	NPO-30241	This module holds the Tangent Graph code used specifically by the Decision Layer.
✓	path_planner_tangentbug	infrastructure changes only	Path Planning	JPL	Laubach	NPO-30241	Sharon Laubach's original R7 path planner.
✓	planner_tempest	infrastructure changes only	Path Planning				TEMPEST is an autonomous, energy-cognizant planner for long-range rover navigation.
✓	graph_search_dstar	infrastructure changes only	Path Planning	CMU	Stentz, Wettergreen	contract	Search graph algorithm called D*
✗	graph_search_ise	new module	Path Planning	CMU	Stentz	contract	An extension of the D* graph search algorithm called Incremental Search Engine.
✓	project_2d3d_tracking	infrastructure changes only	Projects	multiple		main	Generic (non-rover specific) test code for the 2D/3D tracking task.
✓	project_2d3d_tracking_r8	infrastructure changes only	Projects	multiple		main	Rocky 8 specific code for the 2D/3D tracking task.
✓	project_camera_group_1394	infrastructure changes only	Projects	multiple		main	Synchronized camera group for 1394 (Firewire) digital cameras using the hw_pci_mr-1394-dc (Mindready 1394) driver.

🚫	project_celestial_navigator	new restricted module	Projects				Software developed for the Mars Celestial Navigator Project.
❌	project_fido2_stack	new module	Projects				Demo code to drive three physical motors and nine virtual
❌	project_integrated_manipulation	new module	Projects				This is a working directory for the delivery of the Intelligent System (IS) transition (under ESR&T) funded Autonomous Robotic Manipulator Control task. Utilities and tools used almost exclusively by the k9 project.
❌	project_k9_common	new module	Projects				Code specific to the CLARAty 2004 level 1 end-of-year milestone
❌	project_milestone04	new module	Projects				Project module for the moonrise/soops demo.
🚫	project_moonrise	new restricted module	Projects				This project contains development code for the CMU-JPL task: "Very rough terrain non-holonomic motion planning"
❌	project_motion_planning	new module	Projects				
❌	project_navigator_terrain_adaptive	new module	Projects	MIT/JPL			Terrain adaptive navigator developed by the competed MTP NRA.
❌	project_oasis	new module	Projects	multiple	main		This module contains demonstration software for the OASIS software port to CLARAty.
✅	project_r8_diagnostics	infrastructure changes only	Projects	multiple	main		A collection of test routines to help verify functionality and diagnose problems on the rocky8 rover.
✅	project_rmsa_r8_demo	infrastructure changes only	Projects	multiple	main		This module contains code to demonstrate various aspects of Rocky8, including locomotion, image acquisition, and mast deployment, for the 2003 RMSA program.
❌	project_slope_locomotor	new module	Projects	JPL	Helmick	NPO-40703	Code from "Driving on Slopes" task.
❌	project_star	new module	Projects				Development of STAR climbing bot code
❌	moonrise_arm	new module	Robot Adaptation				4DOF arm for the SOOPS demo
❌	megatron_arm	new module	Robot Adaptation	multiple	main		Module for control of the Amtec based 5-DOF megatron arm
✅	sim_rover	infrastructure changes only	Robot Adaptation	multiple	main		This is a shell class to communicate to ROAMS using a socket interface.
❌	ai_locomotor	new module	Robot Adaptation	CMU	main		Interfaces to the locomotion of the ATRV Jr. COTS mobile robot. Similar to Rocky 8 and FIDO adaptations
❌	amtec_arm	new module	Robot Adaptation	JPL	main		Generic software constructs for robotic arms that use the COTS PowerCube motor controllers.
❌	bluestreak_arm	new module	Robot Adaptation	JPL	main		Adaptation for a robotic arm called Bluestreak. The Rocky8-class arm is based on AMTEC COTS motion control joints
❌	cyclonus_arm	new module	Robot Adaptation	JPL	main		Adaptation for the cyclonus robotic arm.
❌	cyclonus_manip	new module	Robot Adaptation	JPL	main		Adaptation of the cyclonus manipulator: a kinematically equivalent arm to K9 arm.
❌	demo_fido_linux	new module	Robot Adaptation	JPL	main		Software changes to enable the FIDO rover software to run under Linux
❌	dx_arm	new module	Robot Adaptation	multiple	main		Adaptation to the Dexter 4-dof arm
❌	dx_hw_maps	new module	Robot Adaptation	multiple	main		Hardware map for the Dexter arm
❌	dx_mast	new module	Robot Adaptation	multiple	main		Adaptation to the Dexter 4-dof mast
✅	fd_camera	infrastructure changes only	Robot Adaptation	multiple	main		Adaptation of the FIDO camera hardware
✅	fd_commander	infrastructure changes only	Robot Adaptation	multiple	main		Adaptation of the FIDO rover commanding system
✅	fd_d2a	infrastructure changes only	Robot Adaptation	multiple	main		Adaptation of the FIDO digital to analog conversion hardware
✅	fd_dio	infrastructure changes only	Robot Adaptation	multiple	main		Adaptation of the FIDO digital input and output hardware
✅	fd_hw_maps	infrastructure changes only	Robot Adaptation	multiple	main		The FIDO hardware maps
✅	fd_imu	infrastructure changes only	Robot Adaptation	multiple	main		Adaptation of the FIDO Inertial Measurement Unit hardware
✅	fd_locomotor	infrastructure changes only	Robot Adaptation	multiple	main		Adaptation of the FIDO mobility mechanism
✅	fd_locomotor_model	infrastructure changes only	Robot Adaptation	multiple	main		Adaptation of the FIDO mechanism model
✅	fd_mast	infrastructure changes only	Robot Adaptation	multiple	main		Adaptation of the FIDO robotic mast



✓	fd_motor	infrastructure changes only	Robot Adaptation	multiple	main	Adaptation of the FIDO motor control
✓	fd_navigator_morphin	infrastructure changes only	Robot Adaptation	multiple	main	Adaptation of the Morphin terrain analysis for the FIDO rover
✓	fd_rover	infrastructure changes only	Robot Adaptation	multiple	main	Top level adaptation that includes other adaptations
✗	fpga_motor	new module	Robot Adaptation			Algorithms for FPGA to control brushless motors
✗	galvatron_arm	new module	Robot Adaptation			Adaptation for a 4DOF arm based on AMTEC joints
✓	jpl_rover	infrastructure changes only	Robot Adaptation	multiple	main	Generic software constructs that represents a basic rover system
✓	jpl_rover_commander	infrastructure changes only	Robot Adaptation	multiple	main	A Rover_Commander that knows how to command functionality specific to a JPL_Rover.
✗	k10_hw_charger	new module	Robot Adaptation	ARC	main	The K10_hw_charger module provides an interface to the ocean-server battery charger boards.
✗	k9_arm	new module	Robot Adaptation	ARC	main	This module provides the kinematics and via point generation algorithms for the K9 arm.
✗	k9_devices	new module	Robot Adaptation	ARC	main	Pulls together the devices that are being used on K9 to allow inter-device testing
✗	k9_gds_base_placement	new module	Robot Adaptation	ARC	main	Support for automatic computation of rover base placement based on desired target location for instrument placement for the K9 Ground Data System
✗	k9_hw_battery	new module	Robot Adaptation	ARC	main	Device module to interface to K9's HESC and Evmon boards
✗	k9_hw_charger	new module	Robot Adaptation	ARC	main	Interface software for K9's Li-Ion battery charger board
✗	k9_hw_tfx	new module	Robot Adaptation	ARC	main	Device module to interface to K9's TFX board
✗	k9_locomotor	new module	Robot Adaptation	ARC	main	Hardware specialization for the k9 locomotor.
✗	k9_pan_tilt	new module	Robot Adaptation	ARC	main	Adaptation for controlling the pan/tilt head on the K9 rover
✗	liia_hw_maps	new module	Robot Adaptation	JPL	main	STAR hardware maps
✗	pl_hw_maps	new module	Robot Adaptation			Hardware maps for the pluto vehicle.
✗	pl_motor	new module	Robot Adaptation			Motor module for vehicle pluto.
✗	project_pluto	new module	Robot Adaptation			This is the repository for software developed by the Distributed Rover Avionics Software Task for the PLuto Rover.
✓	r7_accel	infrastructure changes only	Robot Adaptation	multiple	main	Rocky 7 acclerometer which reads signals through the analog I/O board
✓	r7_arm	infrastructure changes only	Robot Adaptation	multiple	main	Rocky 7 arm control algorithmtms and kinematics.
✓	r7_camera	infrastructure changes only	Robot Adaptation	multiple	main	Rocky 7 camera image acquisition functions
✓	r7_gyro	infrastructure changes only	Robot Adaptation	multiple	main	Rocky 7 gryscopes driver
✓	r7_hw_maps	infrastructure changes only	Robot Adaptation	multiple	main	Maps for the hardware objects such as digital and analog I/O's cameras, etc.
✓	r7_locomotor	infrastructure changes only	Robot Adaptation	multiple	main	Rocky 7 mobility control algorithms
✓	r7_locomotor_model	infrastructure changes only	Robot Adaptation	multiple	main	Rocky 7 kinematic model
✓	r7_mast	infrastructure changes only	Robot Adaptation	multiple	main	Rocky 7 articulate 3DOF mast control algorithm
✓	r7_models	infrastructure changes only	Robot Adaptation	multiple	main	All model files for the Rocky 7 rovers.
✓	r7_motor	infrastructure changes only	Robot Adaptation	multiple	main	Rocky 7 motor control algorithm and interfaces.
✓	r7_rover	infrastructure changes only	Robot Adaptation	multiple	main	Rocky 7 integrated rover software
✓	r7_visual_odometry	infrastructure changes only	Robot Adaptation	multiple	main	Code written to test the wrapped visual_odometry library on Rocky 7.
✓	r8_absolute_heading_sun_sensor	infrastructure changes only	Robot Adaptation	multiple	main	Absolute_heading_sun_sensor for Rocky 8
✓	r8_arm	infrastructure changes only	Robot Adaptation	multiple	main	This module implements the hardware control of the Rocky 8 arm.
✓	r8_base_placement	infrastructure changes only	Robot Adaptation	multiple	main	Support for automatic computation of base placement based on desired target location for instrument placement for the Rocky8 rover
✓	r8_camera	infrastructure changes only	Robot Adaptation	multiple	main	This is a quick and dirty camera class for Rocky 8.
✓	r8_camera_models	infrastructure changes only	Robot Adaptation	multiple	main	Camera models for Rocky 8
✓	r8_commander	infrastructure changes only	Robot Adaptation	multiple	main	An R8_Commander is a Rocky 8 specific Rover_Commander

✓	r8_constr_locomotor	infrastructure changes only	Robot Adaptation	multiple	main	A partially steered model of Rocky 8
✓	r8_device_map	infrastructure changes only	Robot Adaptation	multiple	main	The module contains the default interface for getting devices for a r8_rover
✓	r8_hw_device_map	infrastructure changes only	Robot Adaptation	multiple	main	This class in this module creates the rocky8 hardware devices needed to create a rocky8 hardware rover
✓	r8_estimator	infrastructure changes only	Robot Adaptation	multiple	main	Rocky 8 pose estimator to output rover location and orientation
✓	r8_hw_maps	infrastructure changes only	Robot Adaptation	multiple	main	Rocky 8 Hardware maps that contain all the static initializers
✓	r8_hw_rover	infrastructure changes only	Robot Adaptation	multiple	main	This module is specific to classes for testing an r8_rover in hardware.
✓	r8_locomotor	infrastructure changes only	Robot Adaptation	multiple	main	Rocky 8 software to drive the mobile platform
✓	r8_locomotor_model	infrastructure changes only	Robot Adaptation	multiple	main	Locomotor model implementation for Rocky8
✓	r8_locomotor_state_estimator	infrastructure changes only	Robot Adaptation	multiple	main	R8 test code for locomotor_state_estimator.
✓	r8_mast	infrastructure changes only	Robot Adaptation	multiple	main	Rocky 8 mast control software
✓	r8_models	infrastructure changes only	Robot Adaptation	multiple	main	All model files for the Rocky 8 rovers.
✓	r8_motor	infrastructure changes only	Robot Adaptation	multiple	main	This is the specialized motor class for Rocky 8.
✓	r8_motor_new	infrastructure changes only	Robot Adaptation	multiple	main	New implementation of the Rocky 8 motor
✓	r8_navigator_morphin	infrastructure changes only	Robot Adaptation	multiple	main	Rocky 8 specific implementation of the morphin navigator
✓	r8_pose_estimator_ekf_6d	infrastructure changes only	Robot Adaptation	multiple	main	Rocky 8 Adaptation of Stergios' 6DOF EKF.
✓	r8_rover	infrastructure changes only	Robot Adaptation	multiple	main	This is the top level Rocky 8 rover class for the CLARAty functional layer.
✓	r8_rover_factory	infrastructure changes only	Robot Adaptation	multiple	main	This class that contains a static method to create a rocky8 rover from a device map.
✓	r8_rover_model	infrastructure changes only	Robot Adaptation	multiple	main	Contains constants, enums, and other model related objects for rocky8
✓	r8_rs_device_map	infrastructure changes only	Robot Adaptation	multiple	main	The class in the module creates the rocky8 devices needed to create a rocky8 rover for use with roams.
✓	r8_rs_rover	infrastructure changes only	Robot Adaptation	multiple	main	This module is specific to classes for testing an r8_rover in ROAMS.
✓	r8_visual_odometry	infrastructure changes only	Robot Adaptation	multiple	main	Code written to test the wrapped visual_odometry library on Rocky 8.
✗	rflex	infrastructure changes only	Robot Adaptation	multiple	main	Interface to the RWI reflex code (for ATRV, B21, etc).
✓	rs_camera	infrastructure changes only	Robot Adaptation	multiple	main	A ROAMS camera
✓	rs_client	infrastructure changes only	Robot Adaptation		main	Basic interface to a rs_server
✓	rs_connector	infrastructure changes only	Robot Adaptation	multiple	main	Roams_proxy creates an object which establishes a connection to Roams and enables users to send ascii messages to Roams.
✓	rs_imu	infrastructure changes only	Robot Adaptation	multiple	main	Roams simulator interface for IMU data.
✓	rs_locomotor	infrastructure changes only	Robot Adaptation	multiple	main	The locomotor for the ROAMS simulation.
✓	rs_locomotor_state_estimator	infrastructure changes only	Robot Adaptation		main	Roams test code for locomotor_state_estimator.
✓	rs_motor	infrastructure changes only	Robot Adaptation	multiple	main	rs_motor is the code for the Claraty class derived from Ctrl_Motor_Impl.
✓	rs_navigator_morphin	infrastructure changes only	Robot Adaptation	multiple	main	Morphin on ROAMS with a simulated R8 rover model, but using an rs_locomotor and rs_camera
✓	rs_objects	infrastructure changes only	Robot Adaptation	multiple	main	An implementation of all Roams classes/objects defined in RoamsIF.h and RoamsRover.h.
✓	rs_pose_estimator_ekf_6d	infrastructure changes only	Robot Adaptation	multiple	main	Roams adaptation of Stergios' 6DOF EKF.
✓	rs_rover	infrastructure changes only	Robot Adaptation	multiple	main	A ROAMS rover that uses an RS_Locomotor and RS_Camera and can model a JPL Rover supported by ROAMS (using the proper locomotor models).
✓	rs_server	infrastructure changes only	Robot Adaptation	multiple	main	A ROAMS server (ROAMS running with a RoamsIF server that uses claraty sockets).
✓	rs_utils	infrastructure changes only	Robot Adaptation	multiple	main	This is a place for roams utility programs and scripts.
✓	rover	infrastructure changes only	Rover	multiple	main	Top level rover classes.

✓	rover_commander	infrastructure changes only	Rover	multiple		main	A Rover_Commander is an object that has a Rover, an Executive (actually an Execution_Engine), and a connection to the Decision Layer (with an FL_Listener/Talker).
✓	analysis_carbonate	infrastructure changes only	Science	ARC	Roush	contract	Algorithms to analyze carbonates in rocks from spectrometer data
✓	analysis_detector_carbonate_wesley	infrastructure changes only	Science	Wesleyan U	Bornstein,Ca stano, Gilmore, Merrill, Greenwood	NTR#	Algorithms to detect carbonate in samples (e.g. rocks) from VIS/NIR spectrometer data
✗	analysis_detector_jarosite_wesley	new module	Science	Wesleyan U	Bornstein,Ca stano, Gilmore, Merrill, Greenwood	NTR#	Algorithms to detect jarosite in samples (e.g. rocks) from VIS/NIR spectrometer data
✓	analysis_edge	infrastructure changes only	Science	ARC	Roush	contract	Algorithms to find rock edges and other layer edges in images of outdoor terrain
✓	analysis_ellipse_detect	infrastructure changes only	Science	multiple		main	Algorithm to detect ellipses in 2D grey scale images of rocks
✓	analysis_region	infrastructure changes only	Science	multiple		main	Basic tools for general purpose image analysis tools
✓	analysis_rock_finder_oasis	infrastructure changes only	Science	JPL	Castano	NTR#	Algorithms to finds rocks in an image
✓	analysis_science_easir	infrastructure changes only	Science	ARC	Roush	contract	Algorithms to produce semantic interpretations of image and spectral data that can be used to detect rocks, layers, carbonates, and so on.
✓	analysis_shape_detection	infrastructure changes only	Science	ARC	Roush	contract	Algorithms to detect parallelograms and stellar patterns in 2D gray-scale images.
✗	analysis_spectra_bayes	new module	Science	ARC	Roush	contract	Algorithms that use Bayesian Belief Networks to classify spectra.
✗	analysis_target_signature	new module	Science	JPL	Castano	NTR#	Algorithms to compare feature vectors with user-defined, weighted target signatures, scoring each feature vector on how close it matches the target signatures.
✓	analysis_terrain_morphin	infrastructure changes only	Science	CMU	Simmons	main	Algorithm that takes 3D points and maps them into a 2D grid array. The algorithm also performs analysis for the traversability of this terrain.
✓	analysis_vista	infrastructure changes only	Science	multiple		main	3rd party open source vision library
✓	multiple_rock_finder	infrastructure changes only	Science				This module contains the multiple rock finding code developed at Ames.
✓	refl_spectrometer	infrastructure changes only	Science	multiple		main	Specialization of the basic spectrometer class which deals with reflectance spectrometers.
✓	refl_spectrum	infrastructure changes only	Science	multiple		main	Specialization of the spectrum data type for representing reflectance spectra.
✗	sun_ephemeris	infrastructure changes only	Science	multiple		main	This module is the base class for sun ephemeris implementations.
✓	imu	infrastructure changes only	Sensors	multiple		main	Generic hardware interface for an IMU
✗	msf_battery	new module	Simulation	multiple		main	Components to bridge between CLARAty battery device classes and corresponding MSF classes
✗	msf_device	new module	Simulation	multiple		main	Components to bridge between CLARAty Device and MSF DeviceInstance
✗	msf_motor	new module	Simulation	multiple		main	Components to bridge between a CLARAty Dev_Motor and an MSF CtrlMotor
✓	simple_sim_rover	infrastructure changes only	Simulation	multiple		main	A subclass of Rover that does a very simple simulation of the public methods.
✗	terrain_simulator_simple	infrastructure changes only	Simulation				Creates a synthetic artificial environment within which rovers can wander around.
✗	user_cmu_sim_interface	infrastructure changes only	Simulation	multiple		main	This module contains classes that provide an interface to the CMU "Fire" simulator.
✓	arc_slog_tracker	infrastructure changes only	Vision	ARC	Bualat	contract	Vision-based feature tracker that uses standard 2D normalized cross correlation for tracking rock features during rover motions.
✓	arc_vision	infrastructure changes only	Vision	ARC	Kunz	main	Vision-related software utilities that are used at NASA ARC which have not been yet been added to the proper modules.
✓	camera	infrastructure changes only	Vision	multiple		main	Software constructs for generic image acquisition
✓	camera_image	infrastructure changes only	Vision	multiple		main	Software constructs for images acquired by a camera. Also includes constructs for Camera_Model, frame number, and time stamping of standard Images.

✓	camera_image_io	infrastructure changes only	Vision	multiple		main	Software constructs for loading and saving of camera images in different formats
✗	camera_image_io_pds	new module	Vision	multiple		main	Algorithms to load and save images in PDS format.
✓	camera_image_io_png	infrastructure changes only	Vision	multiple		main	Algorithms to load and save images in standard PNG format.
✓	camera_model	infrastructure changes only	Vision	multiple		main	Software constructs and interfaces for managing camera models with different mathematical representations.
✓	camera_model_jpl	infrastructure changes only	Vision	multiple		main	JPL's implementation of a CAHVOR(E) camera model
✓	camera_mr1394	infrastructure changes only	Vision	JPL		main	Software constructs for interfacing and synchronizing FireWire cameras running a COTS MindReady driver. Used with vxWorks operating system
✓	camera_px610	infrastructure changes only	Vision	JPL		main	Interface to the PX610 framegrabber
✓	camera_pxc200	infrastructure changes only	Vision	JPL		main	Interface to the PXC200 framegrabber
✓	camera_v4l	infrastructure changes only	Vision	multiple		main	Implementation of Video4Linux cameras
✓	camera_vx1394	infrastructure changes only	Vision	multiple		main	Camera implementation for 1394 (FireWire) digital cameras using the (Mindready 1394) driver.
✓	corner_detect_op	infrastructure changes only	Vision	multiple		main	Algorithm to detects corners in grayscale images
✗	crater_detector	new module	Vision	JPL	Cheng	NTR#	Algorithms to detect ellipses in grayscale images of cratered terrain.
✓	edge_detect_op	infrastructure changes only	Vision	multiple		main	Algorithm to detect edge in gray scale images
✓	feature_tracker	infrastructure changes only	Vision	multiple		main	Algorithms that track gray scale feature windows in an image
✓	image	infrastructure changes only	Vision	multiple		main	Generic software constructor for manipulating images
✓	image_io	infrastructure changes only	Vision	multiple		main	Image file loading and saving operation.
✓	image_io_png	infrastructure changes only	Vision	multiple		main	Image file loading and saving operations with lossless compression
✓	image_io_pnm	infrastructure changes only	Vision	multiple		main	Image file loading and saving for color and greyscale pnm formatted images
✓	image_io_tiff	infrastructure changes only	Vision	multiple		main	Image loading and saving using the TIFF format.
✓	image_ops	infrastructure changes only	Vision	multiple		main	Image operations such as convolution and erosion.
✓	image_pyramid	infrastructure changes only	Vision	multiple		main	Algorithm for creating image pyramids: an image maintained at different resolutions
✓	image_rgb	infrastructure changes only	Vision	multiple		main	This module contains a color image representation.
✓	image_tiff_io	infrastructure changes only	Vision	multiple		main	Support for loading/saving images in the TIFF format.
✓	jplpic	infrastructure changes only	Vision	JPL	Maimone	NTR#	Custom implementation for image functionality
✓	jplpic_file_io	infrastructure changes only	Vision	JPL	Maimone	NTR#	Software for reading and writing many different types of images
✓	jplpic_libmwm	infrastructure changes only	Vision	JPL	Maimone	NTR#	Tester for the D* algorithm
✗	mesh_registration	new module	Vision				This module contains mesh registration code developed at the NASA Ames Research Center, in the Intelligent Robotics Group.
✗	multiview_registration_ohio	new module	Vision	Ohio State	Li		Multiview Registration of point in an image from one stereo pair to another
✓	rad_visual_tracker	infrastructure changes only	Vision	multiple		main	Relative Affine Depth predictor and Tracker
✓	rectify_op	infrastructure changes only	Vision	multiple		main	Rectification of an Image using a Camera_Model
✓	stereo_processor	infrastructure changes only	Vision	multiple		main	Allows the capability to generate a disparity image, range image, and point cloud from two camera images.
✓	stereo_vision_arc	infrastructure changes only	Vision	multiple			the Ames stereo code (nee "The Stereo Pipeline") that has since been re-implemented, re-optimized, and overhauled for use on rovers.
✓	stereo_vision_jpl	infrastructure changes only	Vision	JPL	Matthies	NPO-21093	Implementation of stereo vision
✗	stereo_vision_svs	infrastructure changes only	Vision	SRI	COTS	no source code	COTS implementation of stereo vision
✗	stereo_vision_wbs	infrastructure changes only	Vision	U Washington	Olson	contract	This module performs wide-baseline stereo using two arbitrary images together with camera models that estimate the camera positions.
✗	user_stereo	infrastructure changes only	Vision				Uses JPL stereo to generate a depth map from two POV-Ray-generated PGM images.

☑	visual_tracker	infrastructure changes only	Vision	JPL/ARC	Nenas	NPO-40696	The visual_tracker module provides an abstract base class for algorithms that track visual features.
☑	visual_wheel_sinkage	infrastructure changes only	Vision	MIT	Dubowsky	contract	This algorithm takes a single B/W image of a wheel (side view) and estimates the sinkage of the wheel in the terrain based on the contact of the wheel with the terrain level
☑	visual_odometry_tester	infrastructure changes only	Vision	multiple		main	A class that takes the components of a rover (locomotor, cameras, etc) and testing the visual odometry algorithm (visual_pose_estimator)
☑	visual_odometry	infrastructure changes only	Vision / Estimation	multiple		main	Generic software constructs for computing the change in a rover pose (position and orientation) using visual odometry
☑	visual_odometry_jpl	infrastructure changes only	Vision / Estimation	JPL	Cheng	NPO-?	Uses a sequence of stereo images to compute the change in a rover pose (position and orientation)





























